

**REMARKS**

The foregoing Amendment and Remarks which follow are responsive to the Office Action mailed March 11, 2010 in relation to the above-identified patent application. In that Office Action, the Examiner objected to Paragraph 12 of the Specification and to Claim 12 of the pending claims due to minor grammatical informalities therein. In addition, the Examiner provisionally rejected Claims 1-7 on the grounds of non-statutory obviousness-type double patenting as being unpatentable over Applicant's co-pending U.S. Application Serial No. 11/663,673 either standing alone or considered in combination with the Schwamborn et al. reference (U.S. Patent No. 5,958,094).

In addition to the foregoing, the Examiner rejected Claims 1-5 under 35 U.S.C. §103(a) as being unpatentable over Hegemann et al. reference (U.S. Patent No. 4,052,042) in view of the Heijwegen et al. reference (U.S. Patent No. 4,854,946). Claims 2 and 6 were also rejected under Section 103(a) as being unpatentable over the Hegemann et al. and Heijwegen et al. references considered in combination with respective ones of the Dahlstrom reference (U.S. Patent No. 2,760,635) and the Pazdej reference (U.S. Patent No. 4,322,777). Still further, Claims 7-11 were rejected under Section 103(a) as being unpatentable over the Heilmann reference (U.S. Patent No. 3,638,400) in view of the McCord reference (U.S. Patent No. 4,031,184) and the Schwamborn et al. reference. Finally, Claim 12 was rejected under Section 103(a) as being unpatentable over the combination of the Heilmann, McCord and Dahlstrom references.

**Summary of Applicant's Amendments**

By this Amendment, Applicant has amended Paragraph 12 of the Specification of the present application to correct the informality identified by the Examiner. In addition, Applicant has amended independent Claims 1, 7 and 12 in a manner believed to overcome the outstanding rejections under 35 U.S.C. §103(a) advanced by the Examiner in the subject Office Action. It should be noted that in the amended version of Claim 12, the grammatical informality identified by the Examiner in the subject Office Action has been deleted.

*The Obviousness-Type Double Patenting Rejection Should be Withdrawn*

As indicated above, in the subject Office Action, the Examiner has provisionally rejected Claims 1-7 on grounds of non-statutory obviousness-type double patenting as purportedly being unpatentable over Claim 1 of co-pending U.S. Application Serial No. 11/663,673 considered alone or in combination with the Schwamborn et al. reference.

Applicant notes that in the subject Office Action, to substantiate the obviousness-type double patenting rejection advanced in relation to Claims 1 and 4-7, the Examiner has included a claim chart comparing such Claims 1 and 4-7 to Claims 1, 2 and 4 of Applicant's Serial No. 11/663,673. However, Applicant respectfully submits that in an Amendment filed on April 28, 2010 in relation to Serial No. 11/663,673, Claims 1 and 4 were amended, with Claim 2 being cancelled. The April 28, 2010 filing in relation to Serial No. 11/663,673 occurred approximately six weeks subsequent to the mailing of the subject Office Action. Applicant respectfully submits that the changes made to Claims 1, 2 and 4 of Serial No. 11/663,673, further considered in conjunction with the amendments made to Claims 1 and 7 by the present Amendment, have rendered moot the claim comparison presented by the Examiner in the aforementioned claim chart, and have further effectively negated the basis for the outstanding obviousness-type double patenting rejection. Thus, Applicant respectfully submits that the obviousness-type double patenting rejection advanced by the Examiner in relation to Claims 1-7 should be withdrawn, and that no Terminal Disclaimer need be presented by the Applicant to overcome the same.

*Amended Independent Claim 1 is Not Rendered Obvious by the Combination of the Hegemann et al. and Heijwegen et al. References*

In its amended form, independent Claim 1 described the wet dust collector of the bypass system as being operative to remove sulfur included in the bled gas by allowing the sulfur dioxide in the combustion gas to react with calcium hydroxide which is generated when the calcium oxide in the fine particles of the dust of the bled gas reacts with water, to generate gypsum. Applicant respectfully submits that at least these features of amended independent Claim 1 are not taught or suggested by the cited combination of the Hegemann et al. and Heijwegen et al. references.

Some of the beneficial effects of the bypass system recited in amended Claim 1 are best explained in the third paragraph of page 3 of the patent application, reproduced below for the Examiner's convenience.

*With this invention, since dust in the bled gas containing fine particles is collected by using a wet dust collector, collected slurry can be supplied to a water treatment/desalination apparatus as it is, which eliminates a rinsing apparatus conventionally used in desalting process of chlorine bypass dust, resulting in reduced equipment cost. Solvent used for the wet collection is liquefied substance such as water and slurry containing water, which is able to collect dust and the like in the bled gas. In addition to the above, with the present invention, the cooling of the bled gas and the collection of the chlorine bypass dust are simultaneously carried out by the wet dust collector, which eliminates conventionally installed cooler and hot bag filter, and a large scale storage facility, which is conventionally required for chlorine bypass dust with low specific gravity, resulting in remarkably reduced equipment cost. Further, sulfur dioxide (SO<sub>2</sub>) in the combustion gas is desulfurized in such a manner that the sulfur dioxide (SO<sub>2</sub>) reacts with calcium hydroxide (Ca (OH)<sub>2</sub>), which is generated when calcium oxide (CaO) in the fine particles of the dust of the bled gas reacts with water, to be gypsum. Then, the gypsum is discharged out of the cement kiln system, and is effectively utilized in cement mill.*

As understood, the Hegemann et al. reference relates to an apparatus for cleaning the exhaust gas of a high pressure blast furnace. The apparatus includes a duct connected to the blast furnace to receive the exhaust therefrom. The exhaust travels down the duct to a hopper which collects the particles present in the exhaust gas. The gas continues downstream where it is treated by a prewasher unit, and an annular gap washer. The gas is then fed into an expansion turbine or through a bypass duct around the expansion turbine.

The Examiner concedes that the Hegemann et al. reference does not teach a wet dust collector receiving the fine particles and exhaust gas from the separating means with the wet dust collector being configured to separate the fine particles from the gas. As such, the Examiner relies on the teachings of the Heijwegen et al. reference to satisfy this deficiency.

The Heijwegen et al. reference is understood to disclose a method for treating blast furnace gas. The coarsest particles from the blast furnace gas are removed and wet scrubbed prior to being fed to a treatment device for separating the remaining coarse dust. The gas dust is fed to a separator where coarse particles are removed through an outlet, while the remaining gas dust is fed to a settling basin. The dust particles are then fed to a second separator having two hydrocyclones. The coarse particles are removed from the hydrocyclones and fed back to the blast furnace.

Applicant submits that the combination of Hegemann et al. and Heijwegen et al. does not teach, suggest or make obvious a bypass system having a wet dust collector configured to simultaneously remove sulfur by allowing the sulfur dioxide in the combustion gas to react with the calcium hydroxide which is generated when the calcium oxide in the fine particles of the dust of the bled gas reacts with the water, to generate gypsum. In particular, neither reference contemplates a system wherein sulfur from the exhaust gas reacts with calcium hydroxide to generate gypsum. Accordingly, even if the references are combined as suggested by the Examiner, they would not produce the bypass system recited in Claim 1.

Moreover, Applicant further submits that there is no motivation for one skilled in the art to combine the teachings of Hegemann et al. with the teachings of Heijwegen et al. to produce the cement kiln chlorine/sulfur bypass system recited in Claim 1. More specifically, the Hegemann et al. and Heijwegen et al. references are unrelated to a cement burning furnace; rather, the cited references are directed toward a blast furnace. A chlorine bypass system in a cement burning furnace and an exhaust gas treatment system in a blast furnace are installed for different purposes. In this regard, Applicant submits that there is no motivation to modify the teachings of the Hegemann et al. and Heijwegen et al. because such a modification would render such references unsatisfactory for their intended purposes. *See* M.P.E.P. § 2143.01(V)<sup>1</sup>.

Furthermore, the kinds of gas being treated in the respective furnaces are different from each other. In the cement burning furnace, combustion gas is partly withdrawn to remove chlorine and sulfur at a furnace-exit, while in the blast furnace, exhaust gas is bypassed on a turbine side for pressure control only. In this regard, Applicant submits that

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<sup>1</sup> If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.

the Examiner's proposed combination is merely the result of impermissible hindsight, and is not within the purview of one skilled in the art.

As such, amended independent Claim 1 is believed to be allowable, as are all claims depending therefrom.

*Amended Independent Claim 7 is Not Rendered Obvious by the Combination of the Heilmann and McCord References*

As a preliminary matter, Applicant notes that paragraph number 28 found on page 10 of the Office Action indicates that Claims 7-11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Heilmann reference, in view of the McCord reference, and further in view of the Schwamborn reference. However, the analysis of Claim 7, found in paragraph numbers 29-33, is limited to the combination of the Heilmann and McCord references, and there is no discussion or analysis pertaining to the Schwamborn reference. Therefore, it appears that the Schwamborn reference was inadvertently listed in the rejection of independent Claim 7. Thus, Applicant's analysis of amended independent Claim 7 will be focused on the combination of Heilmann and McCord.

In its amended form, independent Claim 7 describes a combustion gas treatment method wherein dust from the gas is collected by a wet dust collector with a solvent and sulfur is simultaneously removed from the gas by allowing sulfur dioxide in the combustion gas to react with calcium hydroxide, which is generated when the calcium oxide in the fine particles of the dust of the bled gas reacts with the water to generate gypsum. Applicant submits that this feature of Claim 7 is not taught or suggested by the cited combination of Heilmann and McCord.

As understood, the Heilmann reference relates to a system for controlling the alkali content during a cement manufacturing process, with the system including a cement kiln having an exhaust through which exhaust gas is directed. The exhaust gas is directed to a separator, wherein precipitated dust defining a particle size less than 5 to 15 microns is separated from the remaining exhaust gas. It is believed that the dust having a particle size less than 5 to 15 microns has a high concentration of alkalis, and that by separating such dust from the exhaust gas, the alkali levels in the system may be controlled.

The McCord reference appears to relate to a process of reclaiming cement kiln dust and recovering the alkali content thereof. The method includes leaching the dust exhausted from the cement kiln with an aqueous solution of potassium chloride and treating the leached slurry of cement kiln dust with oil and a fatty acid to flocculate, and preferably pelletize, the solids. The flocculated or pelletized dust is extracted and is lightly washed or rinsed to further reduce the alkali content.

The Examiner argues that the Heilmann reference discloses the steps of bleeding a kiln exhaust passage of a part of a combustion gas, and separating coarse particles in dust in the bled gas. The Examiner concedes that Heilmann does not teach collecting dust from the gas by a wet dust collector with a solvent, and relies on the McCord reference for such disclosure.

Applicant submits that the combination of Heilmann and McCord does not disclose all of the limitation of amended independent Claim 7. In particular, neither reference discloses simultaneously removing sulfur included in the bled gas by allowing the sulfur dioxide in the combustion gas to react with calcium hydroxide, which is generated when the calcium oxide in the fine particles of the dust reacts with water to create gypsum. The Heilmann reference teaches a separation procedure wherein the fine particles are separated from the coarse particles using centrifugal force (see column 3, lines 46-51). In this regard, the dust is not mixed with a separating agent, such as water, which may allow sulfur dioxide in the combustion gas to react with calcium hydroxide to remove sulfur from the bled gas (as recited in Claim 7). Furthermore, the McCord reference is silent with regard to sulfur removal, as there is no mention of allowing sulfur dioxide in the combustion gas to react with calcium hydroxide.

Therefore, even if the McCord and Heilmann references were combined, as suggested by the examiner, the resultant combination would not yield the method disclosed in amended independent Claim 7.

Moreover, Applicant further asserts that there is no motivation to combine the McCord reference with the Heilmann reference because such a combination goes against the explicit teachings of Heilmann. As mentioned above, the Heilmann reference discloses a centrifugal separation process, wherein the coarser particles move outwardly due to centrifugal force, and the finer particles move inwardly due to air suction. Conversely, the

McCord reference discloses a wet dust collection system that differs from the centrifugal system taught in Heilmann. After reading the Heilmann reference, one skilled in the art would not be motivated to combine the wet dust collection system of McCord with the teachings of Heilmann because such a combination is contrary to the disclosure of Heilmann. As such, Applicant submits that the combination of McCord and Heilmann is simply the result of impermissible hindsight on the part of the Examiner.

Therefore, for the foregoing reasons, independent Claim 7 is believed to be allowable, as are Claims 8-11 as being dependent upon an allowable base claim.

*Amended Independent Claim 12 is Not Rendered Obvious by the Combination of the Heilmann, McCord, and Dahlstrom References*

Independent Claim 12 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of the Heilmann reference, the McCord reference, and further in view of the Dahlstrom reference.

The Heilmann and McCord references are discussed in detail above. The Dahlstrom reference appears to relate to a process and apparatus for separating mixtures of solids in a liquid medium. Dahlstrom teaches the use of a classifier to separate solid particles into at least two groups on the basis of particle size. The classifier uses centrifugal and gravitational forces to separate the particles.

The Examiner argues that one skilled in the art would be motivated to combine the purported air bleed means and separating means, as taught by Heilmann, with the circulating liquid tank of McCord, and the adjustable separating means of Dahlstrom to arrive at the cement kiln bypass system recited in Claim 12.

However, to the extent that independent Claim 12 is similar to independent Claim 7 discussed above, Applicant submits that the combination of Heilmann, McCord and Dahlstrom is deficient for the reasons advanced above in relation to Claim 7. In particular, amended Claim 12 recites a wet dust collector configured to simultaneously remove sulfur by allow the sulfur dioxide in the combustion gas to react with the calcium hydroxide to generate gypsum. The foregoing discussion illustrates that the combination of Heilmann and McCord does not teach such a limitation. Furthermore, the teachings of Dahlstrom do not alleviate the deficiencies of Heilmann and McCord, as Dahlstrom was merely cited for its

purported disclosure of an adjustable separating means (and not for the removal of sulfur from the exhaust gas).

Therefore, the combination of Heilmann, McCord and Dahlstrom do not teach, suggest or make obvious all of the limitations of amended Claim 12. Thus, Claim 12 is believed to be allowable.

Conclusion

In view of the foregoing, the application is believed to be in condition for allowance. Entry of the amendments and issuance of a Notice of Allowance is therefore respectfully requested. Should the Examiner have any suggestions for expediting allowance of the application, the Examiner is invited to contact Applicants' representative at the telephone number listed below.

If any additional fees as due, please charge Deposit Account 19-4330.

Date: 6/10/10

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